



Nashville Severe Weather Awareness Day 2015

February 28, 2015

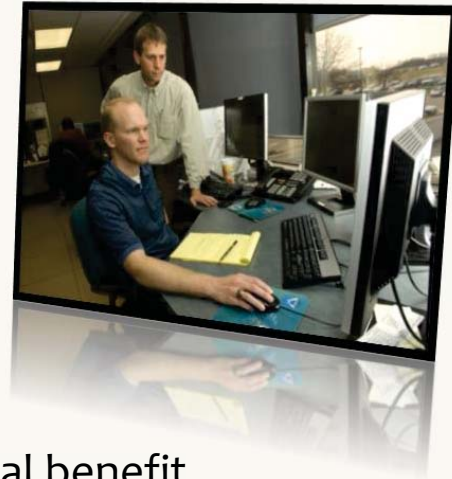
Andrew Molthan
Research Meteorologist, NASA Marshall Space Flight Center
andrew.molthan@nasa.gov

Short-term Prediction Research and Transition (SPoRT)

SPoRT is focused on transitioning unique NASA and NOAA observations and research capabilities to the operational weather community to improve short-term weather forecasts on a regional and local scale.

- close collaboration with numerous WFOs and National Centers across the country
- SPoRT activities began in 2002, first products to AWIPS in 2003
- co-funded by NOAA since 2009 through satellite “proving ground” activities

Proven paradigm for transition of research and experimental data to “operations”



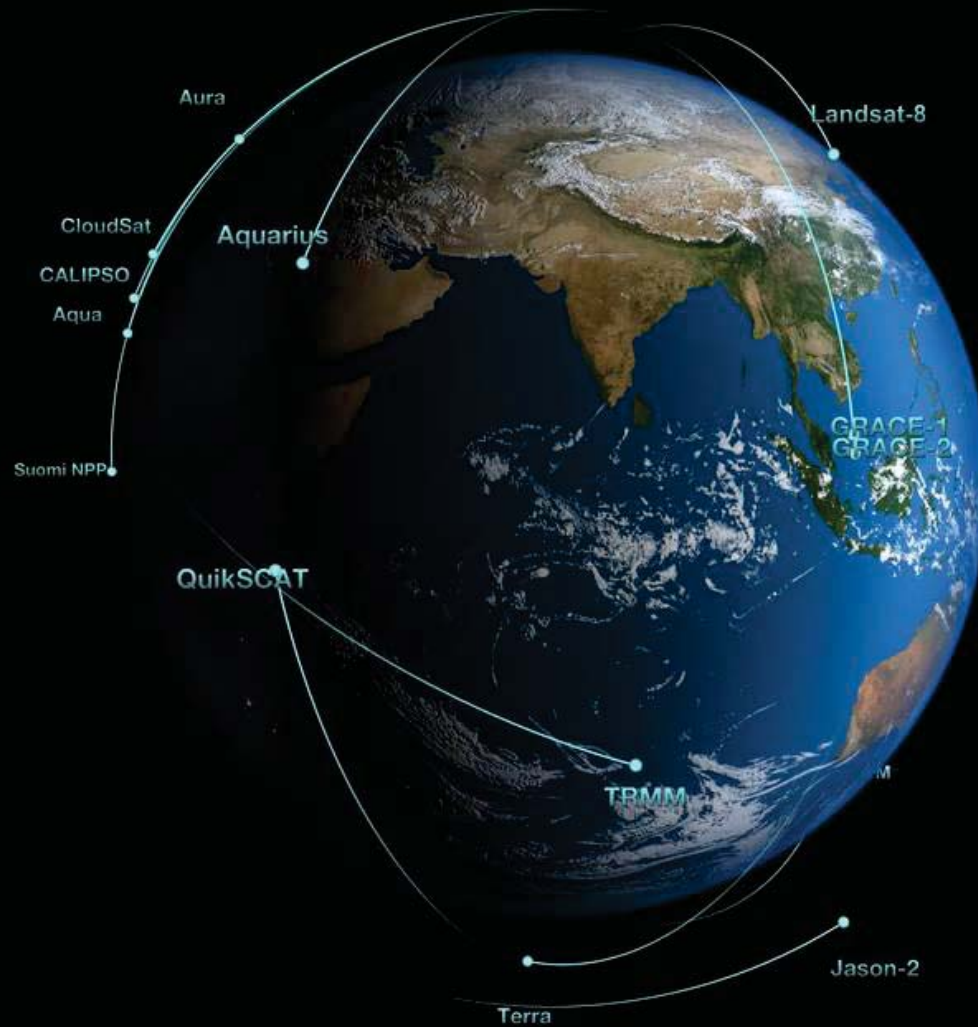
Benefit

- demonstrate capability of NASA and NOAA experimental products to weather applications and societal benefit
- prepares forecasters for use of data from next generation of operational satellites (JPSS, GOES-R)

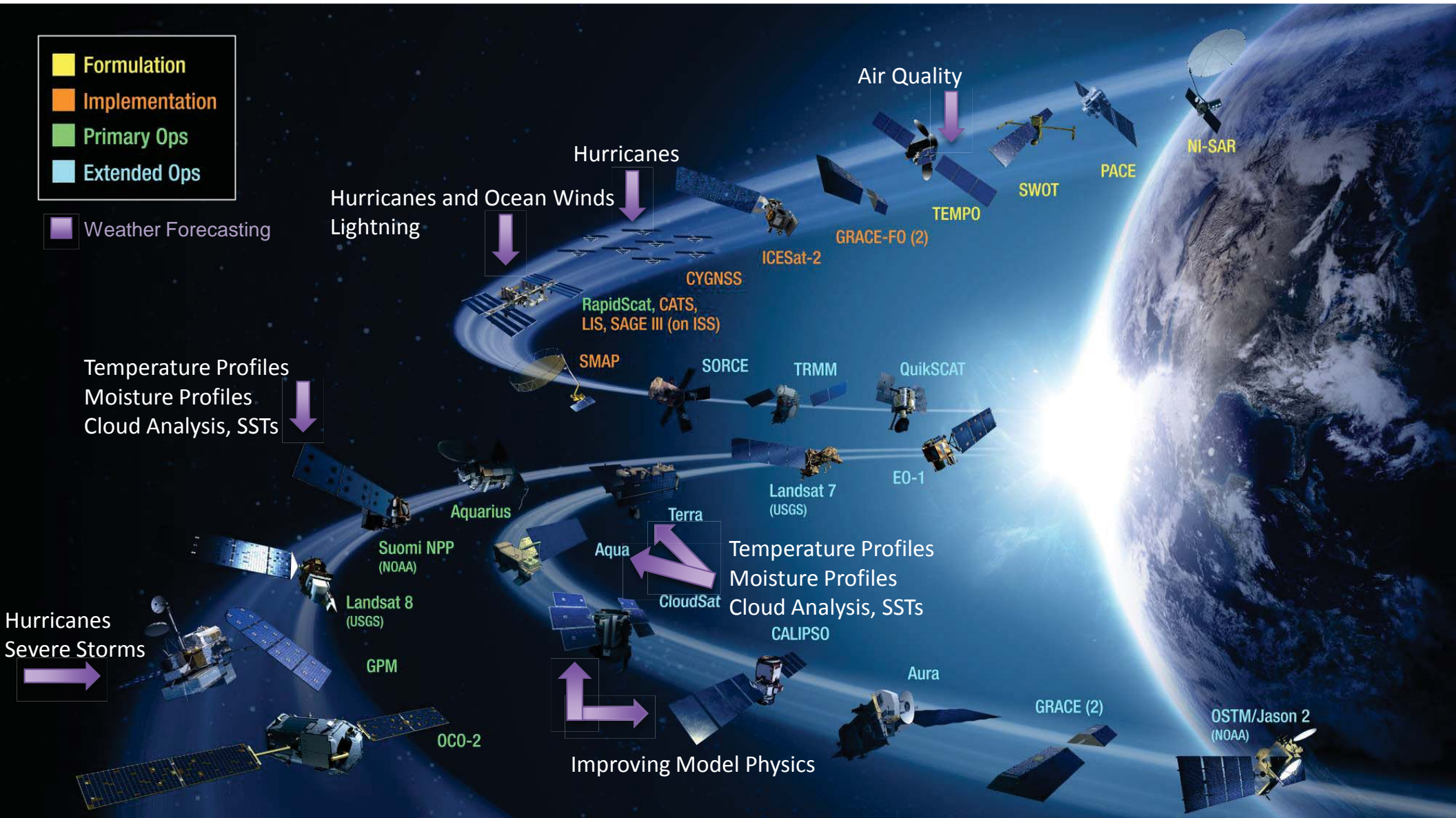


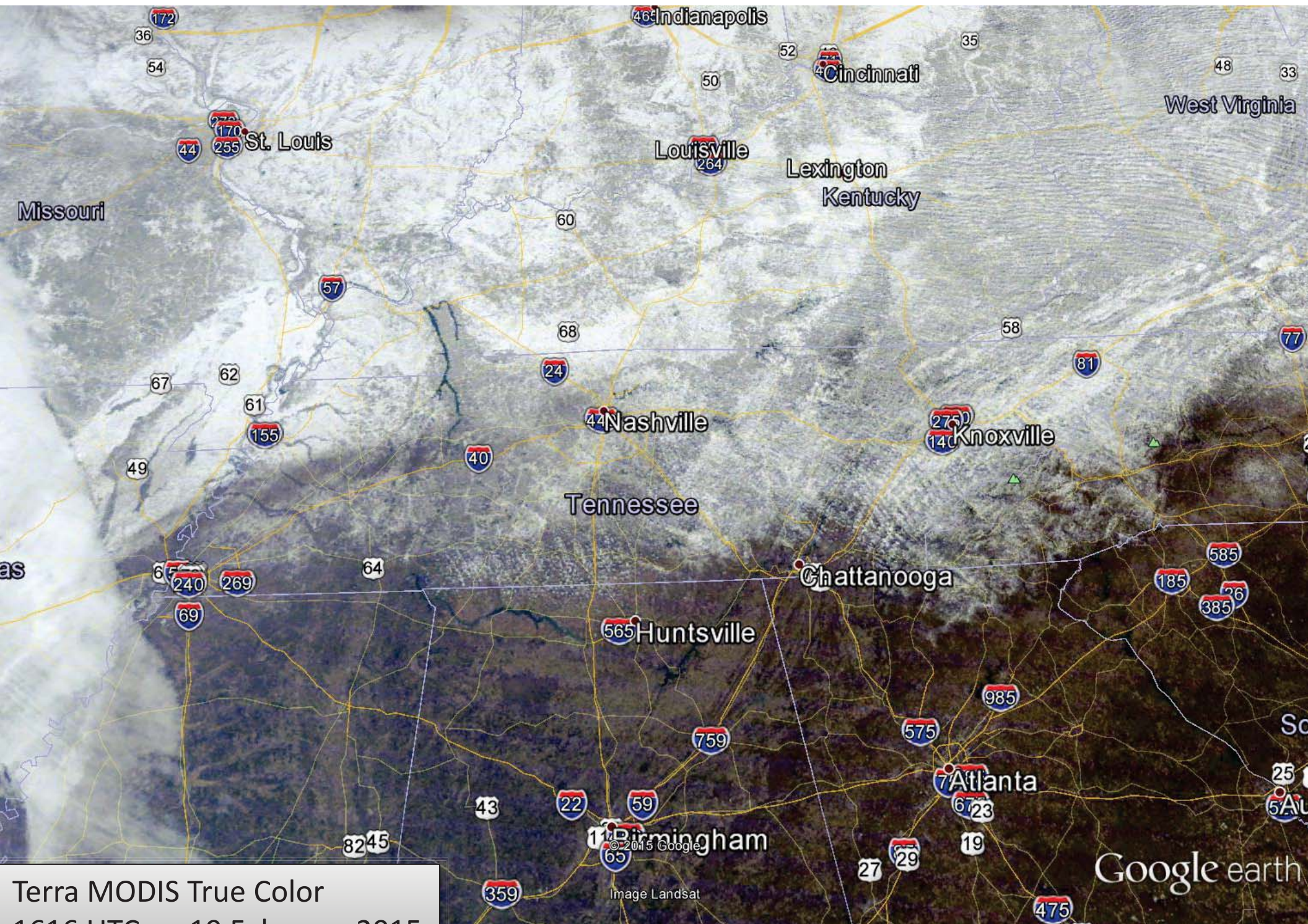
NASA's Fleet of Earth-Observing Satellites

Not shown: International Space Station, Soil Moisture Active Passive (launched Feb. 2015)

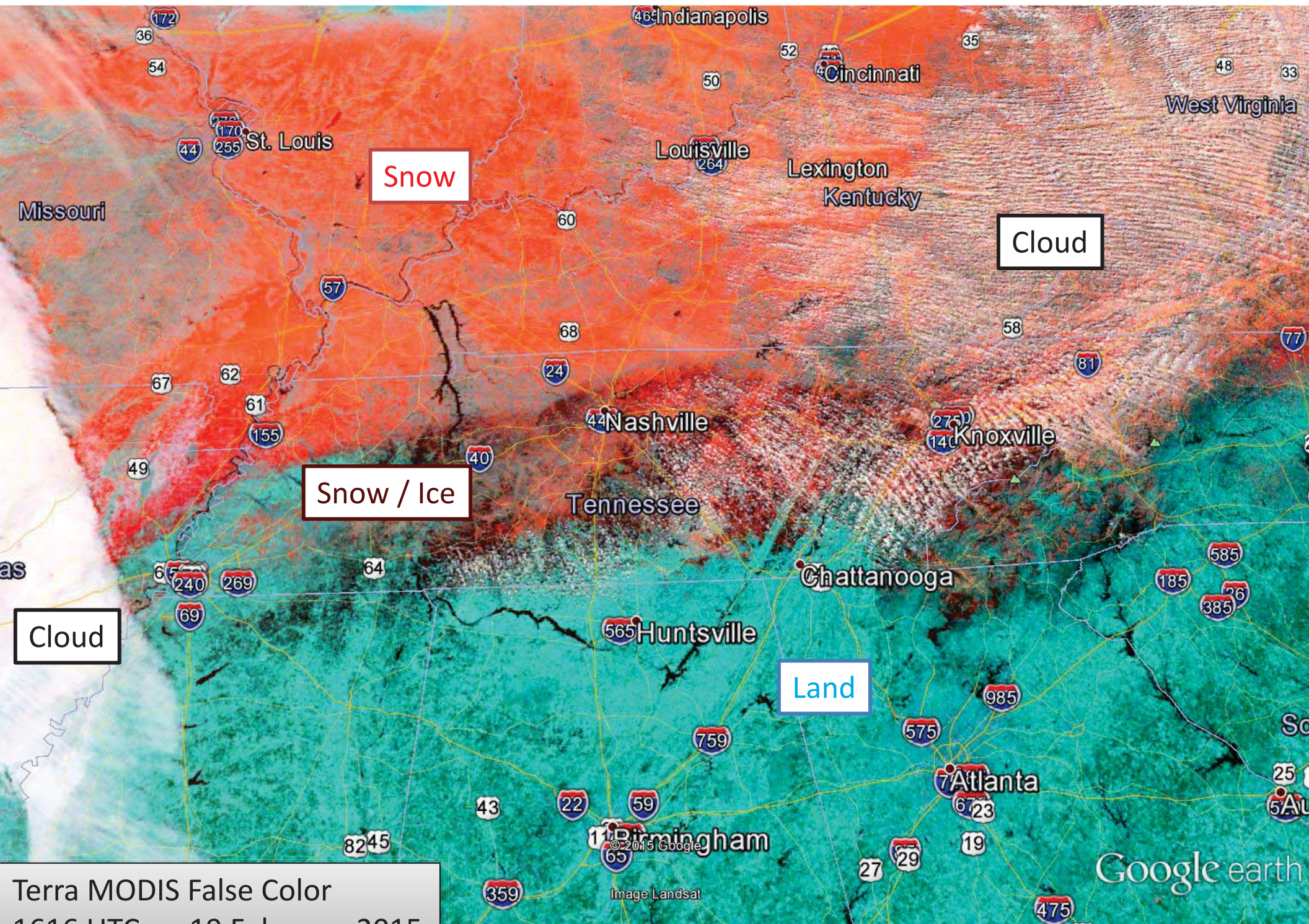


NASA Missions and SPoRT Applications





Terra MODIS True Color
1616 UTC on 19 February 2015



Snow

Cloud

Snow / Ice

Cloud

Land

Terra MODIS False Color
1616 UTC on 19 February 2015

Google earth

AWG Proxy ABI Simulations of Hurricane Katrina

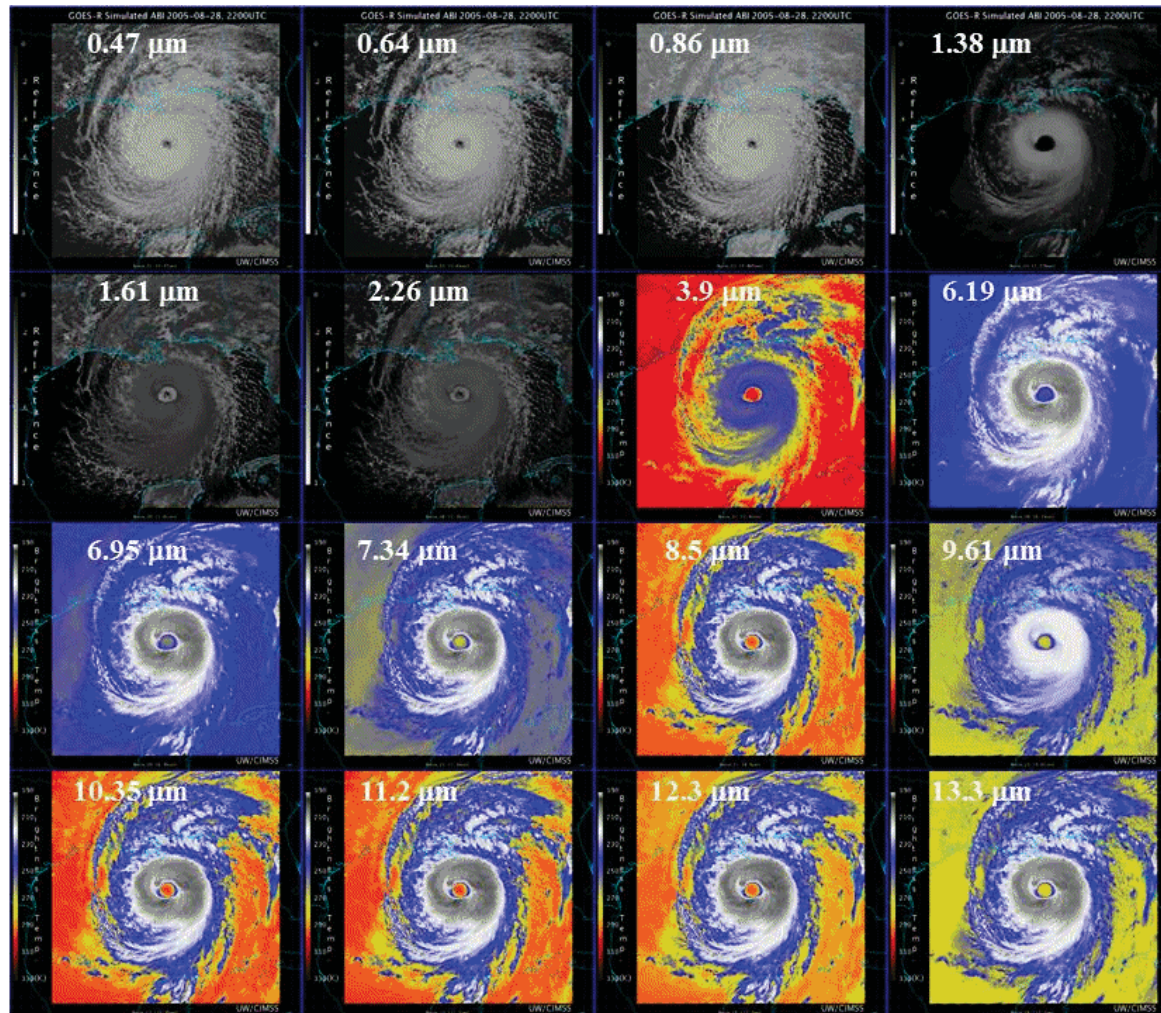
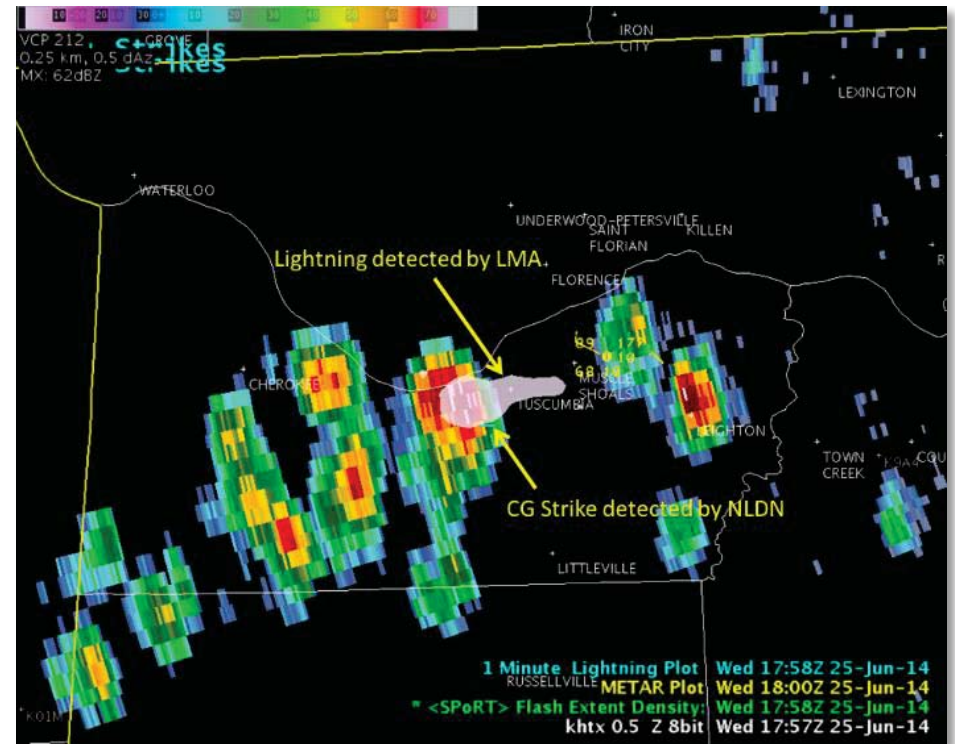
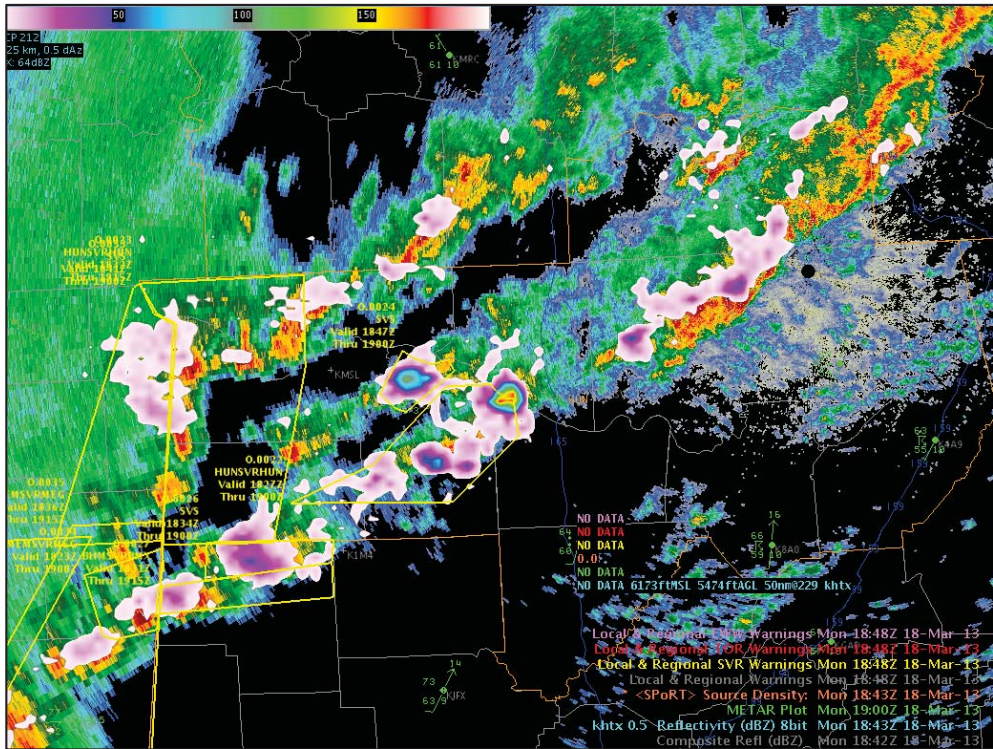


Image: UW/CIMSS

NASA satellites instruments like MODIS and VIIRS observe the clouds and atmosphere at wavelengths available in the upcoming GOES-R (-S) era (2016-onward), providing forecasters and the general public with a look at future geostationary imagery.

Preparing for GOES-R: Lightning



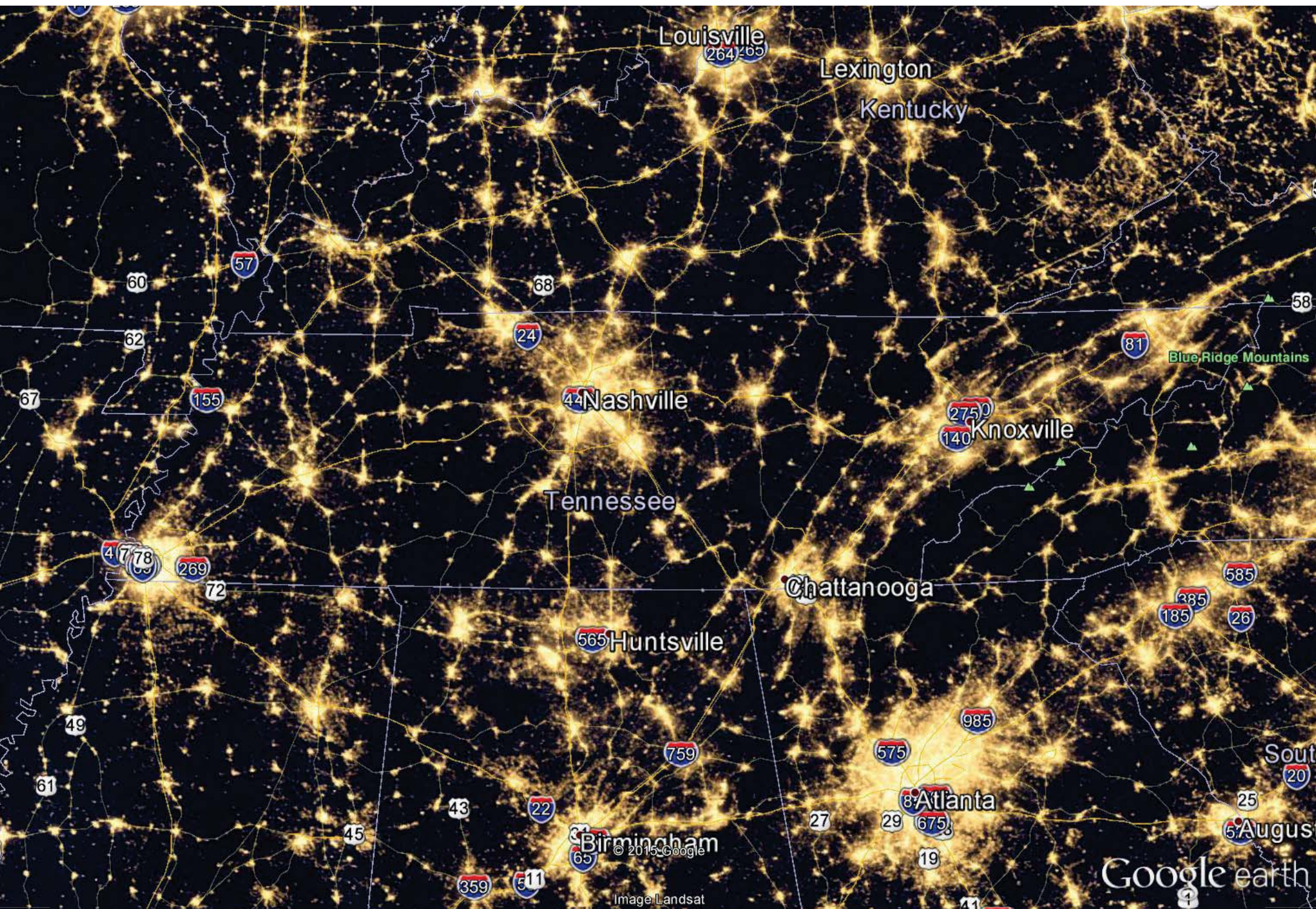
Lightning observations used to identify most severe and active cells (left), and for additional public safety by identifying lightning activity ahead of isolated storms (right).

SPoRT trains forecasters on the use of total lightning observations from GOES-R, to ensure day-one readiness for severe weather forecasting after launch.

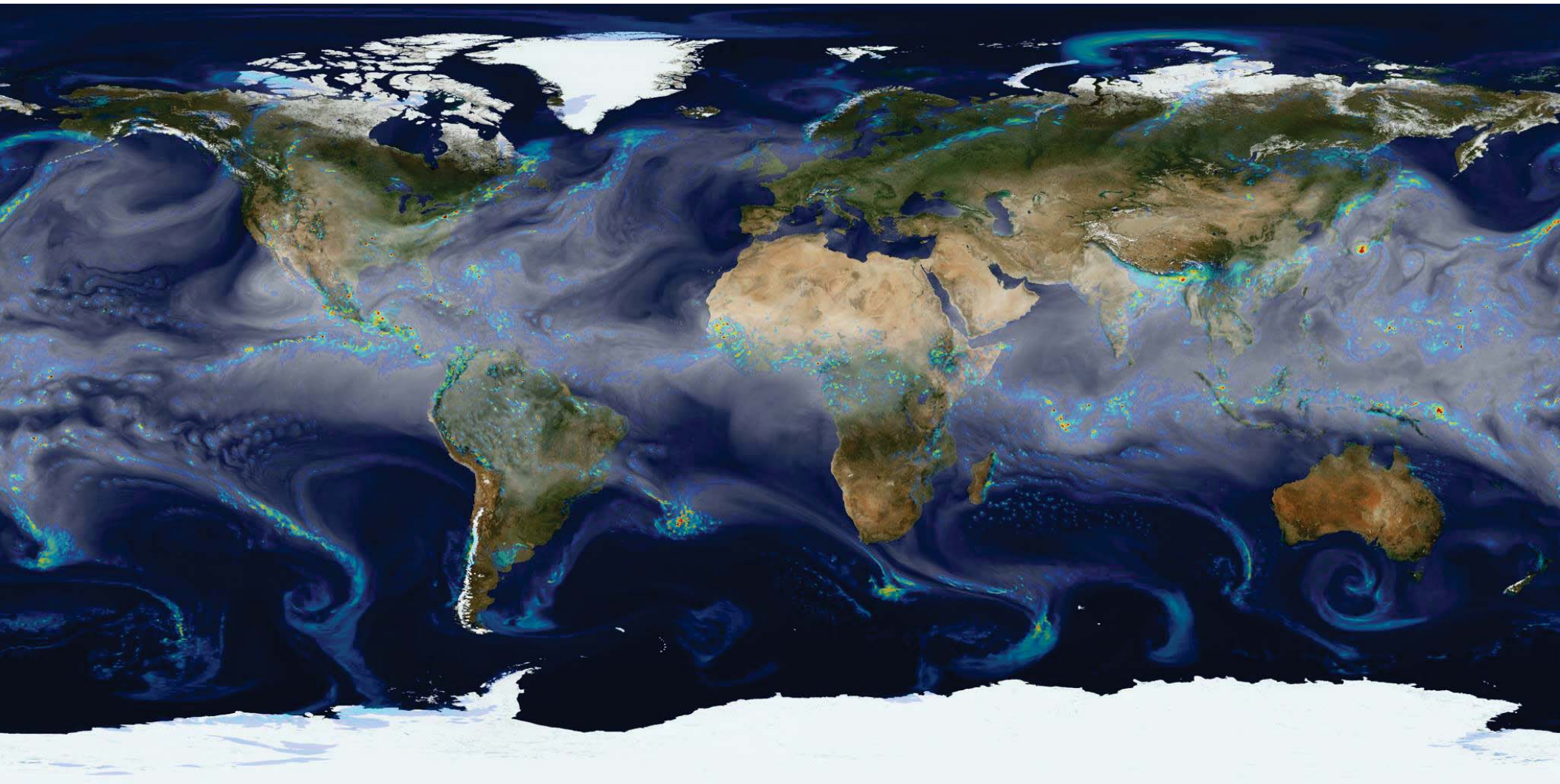




NASA/NOAA “Black Marble” – Lights captured by the Suomi NPP VIIRS Instrument, Day-Night Band



NASA/NOAA "Black Marble" – Lights captured by the Suomi NPP VIIRS Instrument, Day-Night Band



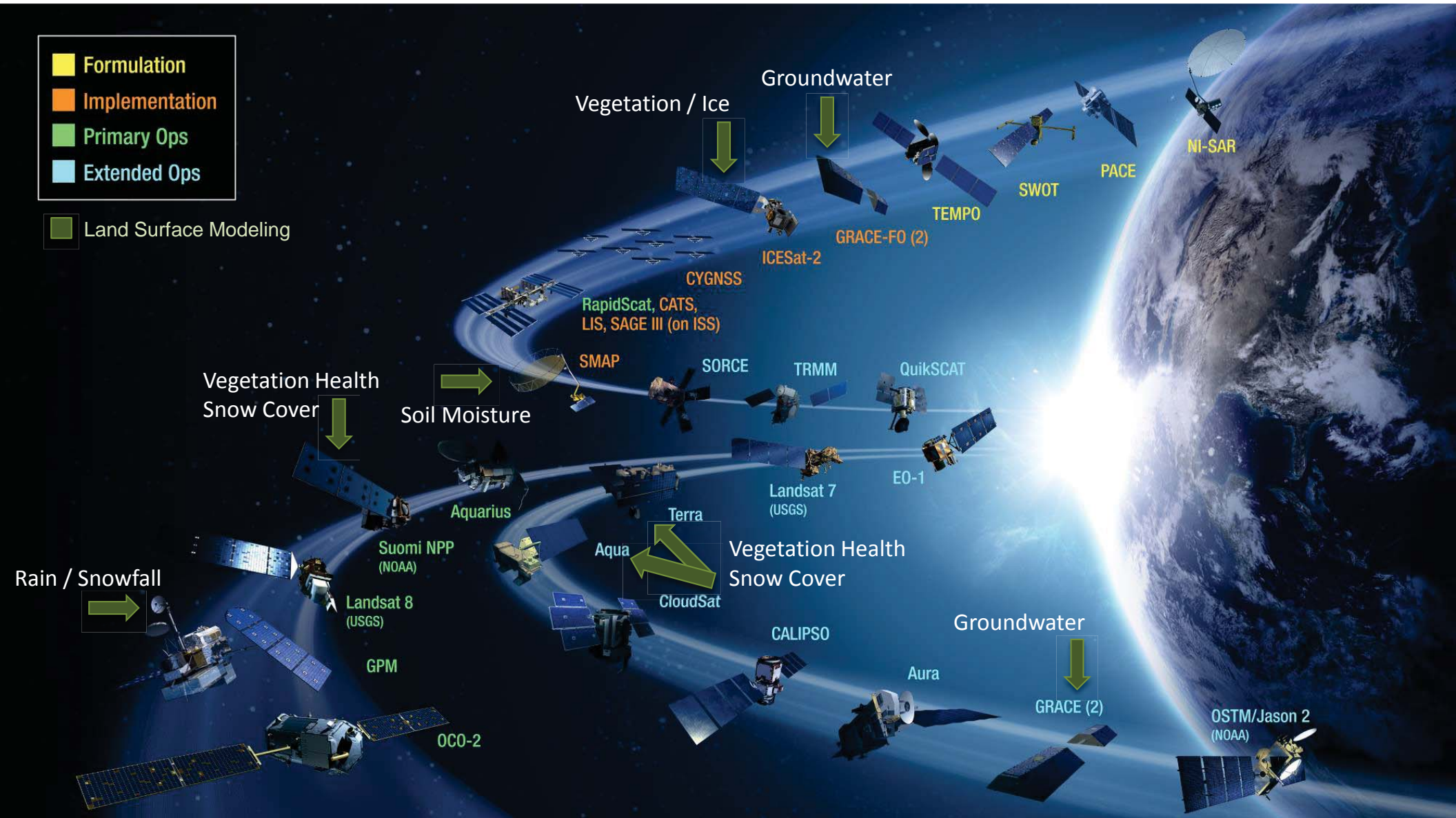
NASA develops global and regional models to simulate weather and climate, through assimilation of satellite data. Here, a “nature run” from Goddard Space Flight Center simulates weather from May 2005-May 2007 at 10 km resolution.



NASA Missions and SPoRT Applications

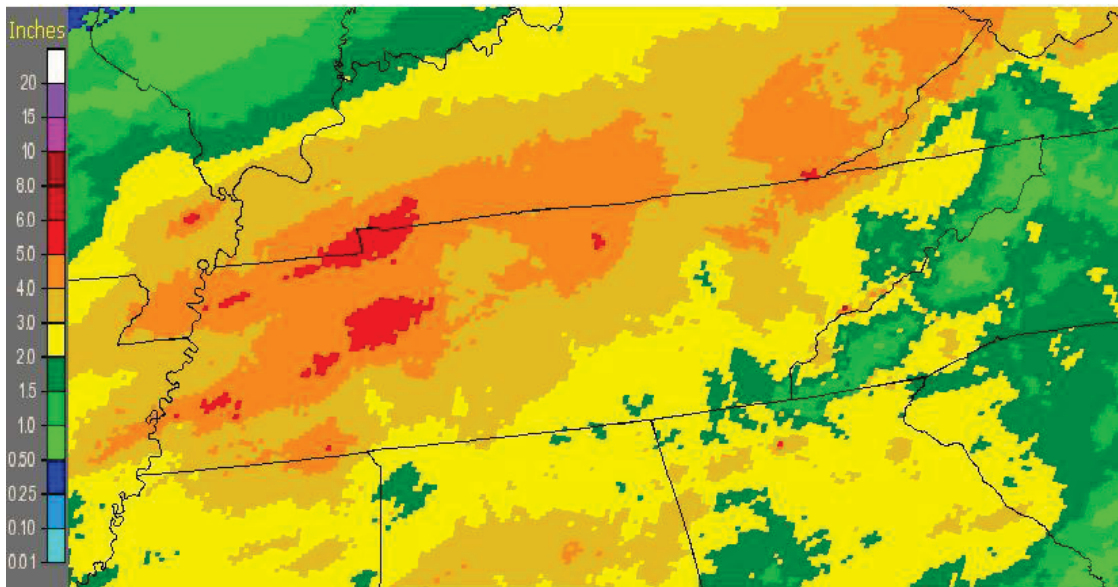


Land Surface Modeling



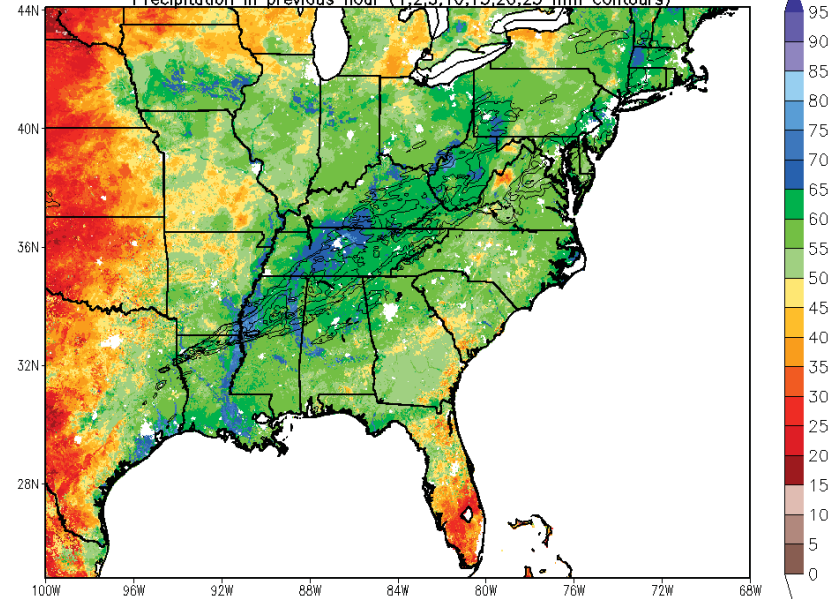
Soil Moisture Applications

Tennessee: Current 14-Day Observed Precipitation
Valid at 2/22/2015 1200 UTC- Created 2/22/15 16:09 UTC



Two-Week Precipitation Ending Sunday, February 22

Column-Integrated Relative Soil Moisture (available water; %) valid 00z 22 Feb 2015
Precipitation in previous hour (1,2,5,10,15,20,25 mm contours)



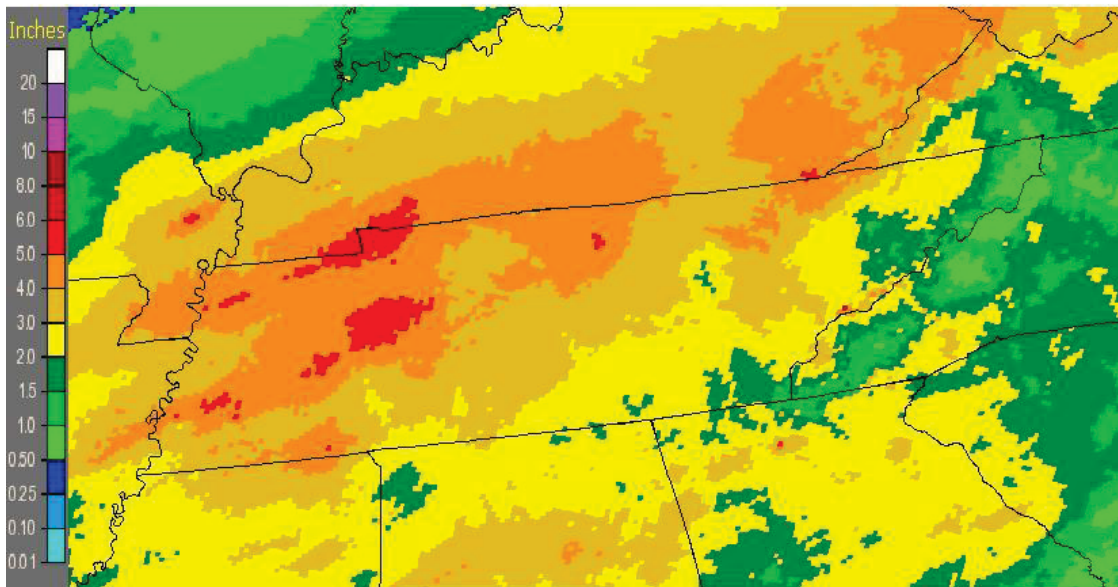
Total Column Soil Moisture

Land surface models allow for the integration, or “assimilation” of precipitation data from ground and space. The recent launch of NASA’s Soil Moisture Active Passive (SMAP) mission allows improved sampling of soil moisture and will improve land surface predictions



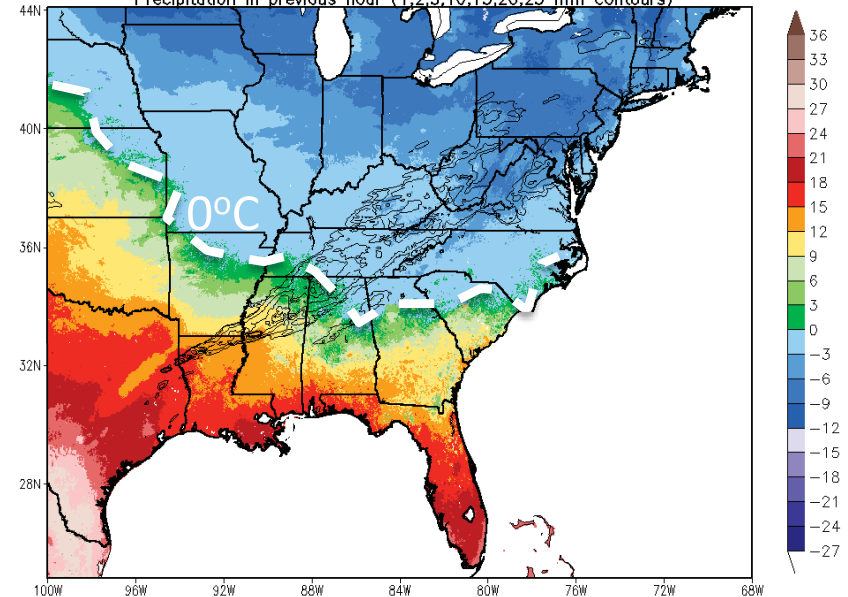
Soil Moisture Applications

Tennessee: Current 14-Day Observed Precipitation
Valid at 2/22/2015 1200 UTC- Created 2/22/15 16:09 UTC



Two-Week Precipitation Ending Sunday, February 22

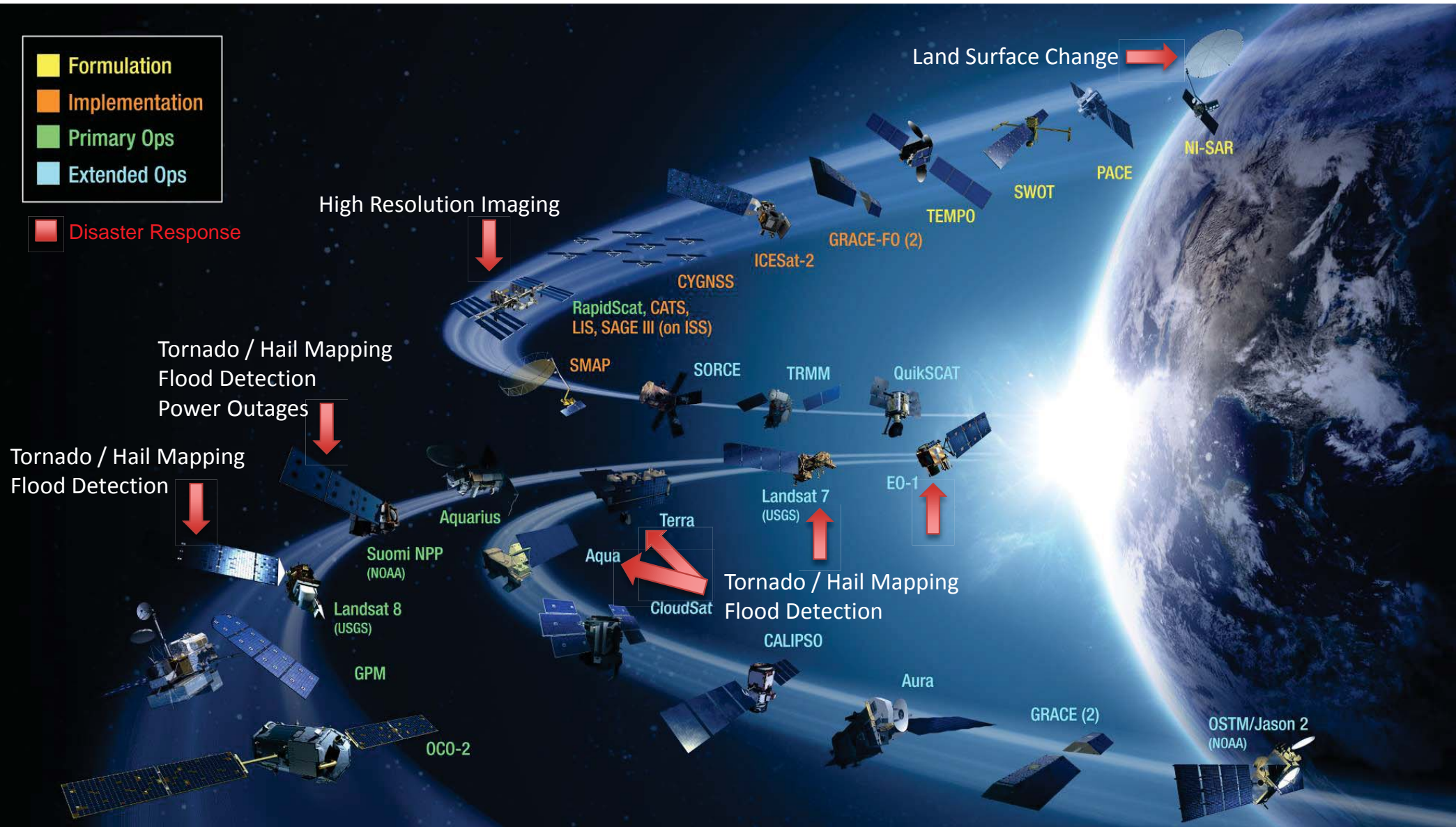
0-10 cm Soil Temperature (C) valid 00z 22 Feb 2015
Precipitation in previous hour (1,2,5,10,15,20,25 mm contours)



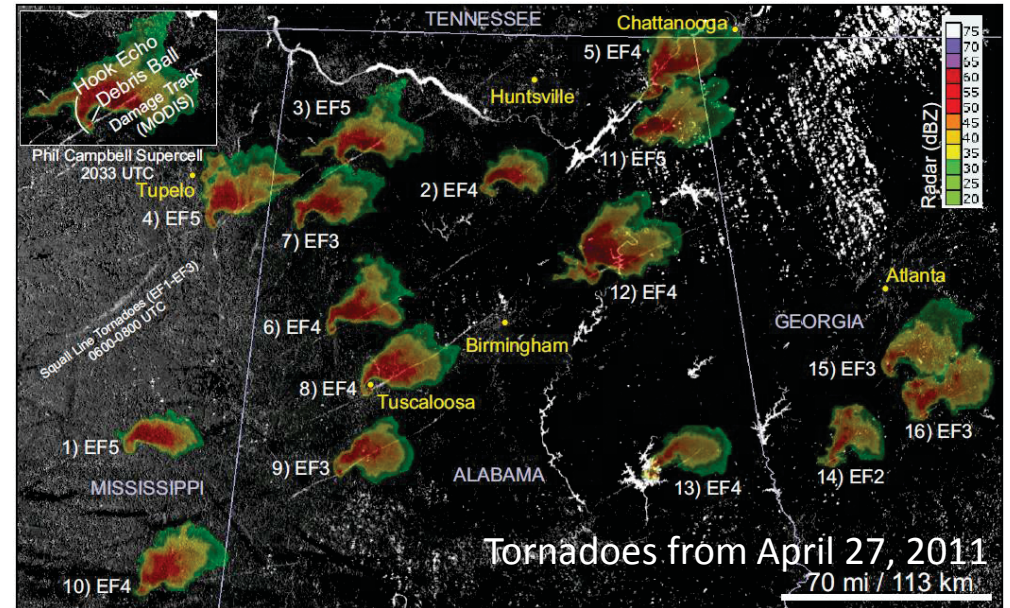
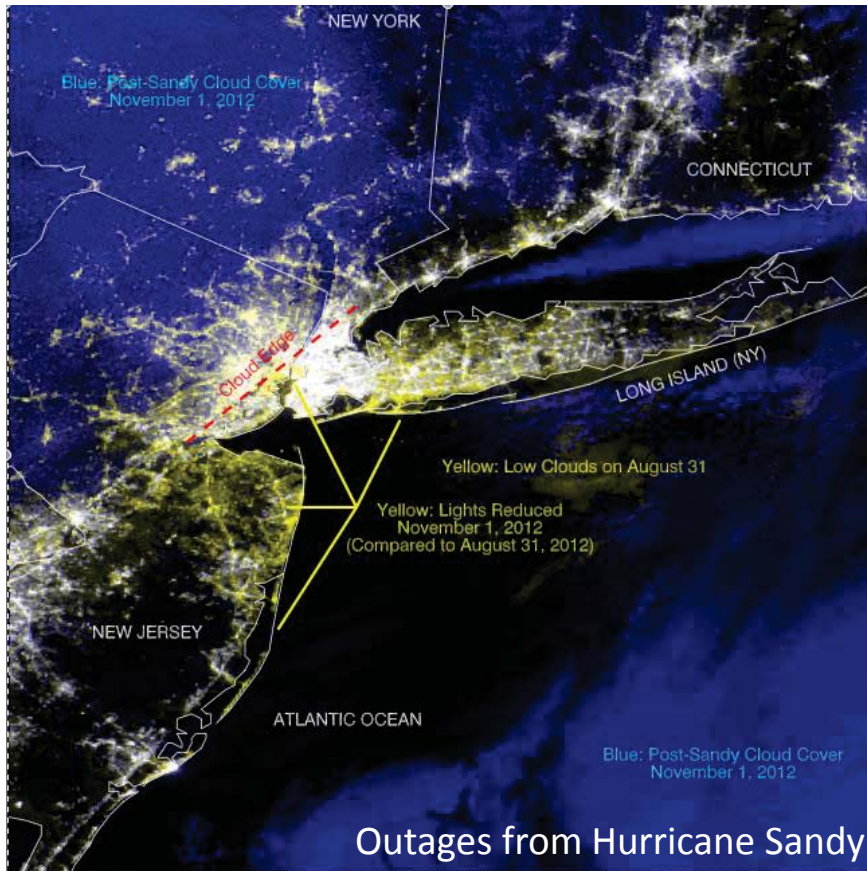
Surface Soil Temperatures

Land surface models can also capture the evolution of near-surface soil temperatures. This helps with winter weather predictions of snow accumulation and frost/freeze, runoff, and various agricultural applications.

NASA Missions and SPoRT Applications



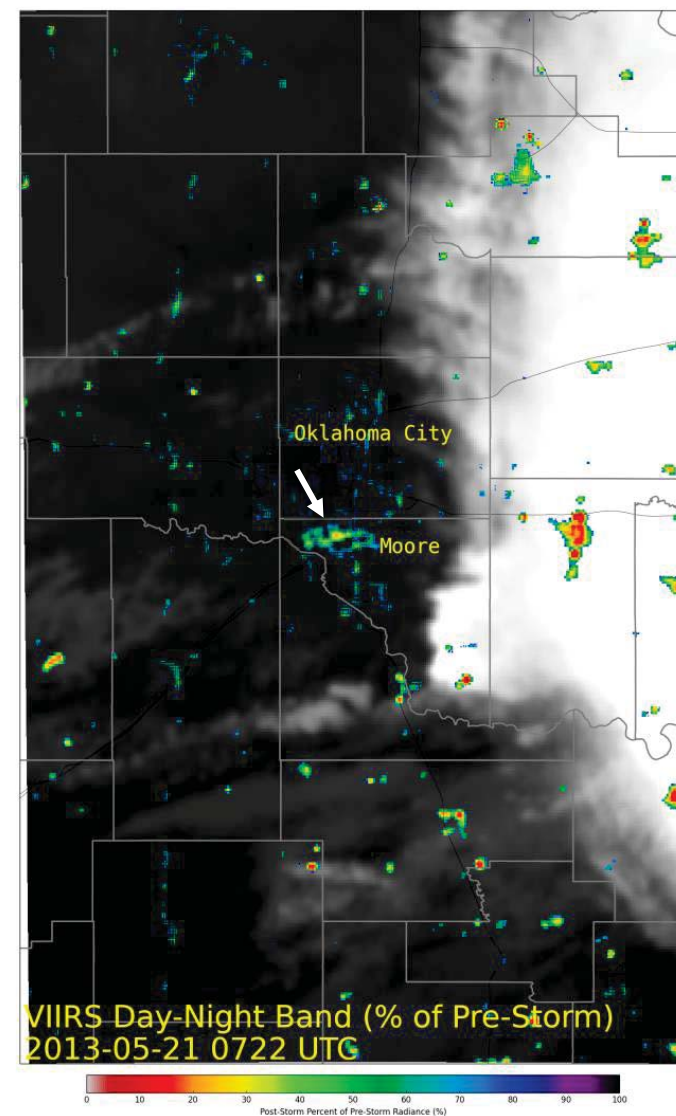
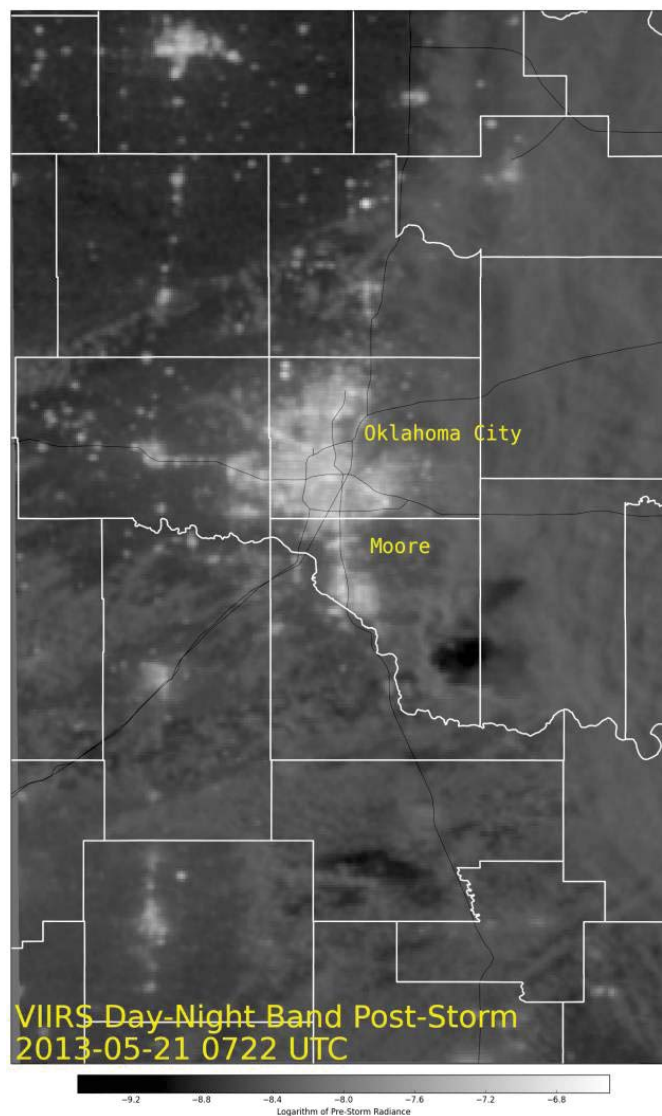
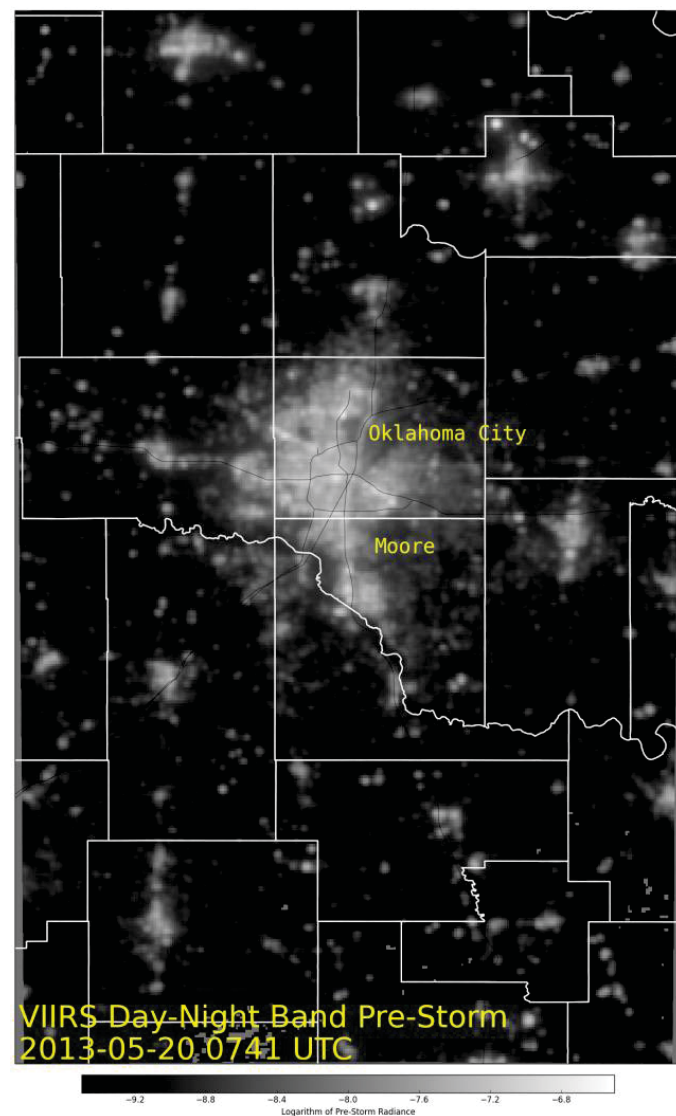
Disaster Applications



VIIRS observations can be used to identify major power outages (left), while MODIS observations can map severe storm damage (right).

SPoRT has developed capabilities to use NASA observations in response to major disasters, providing products, training and support to NOAA/NWS, the Department of Defense, the U.S. Geological Survey, and other end users.





The VIIRS instrument aboard the Suomi NPP mission was one of the first satellite instruments to observe Moore, OK following the May 2013 tornado. Differences in emitted light identify outages across the community following the tornado.



Pre-Event:
April 29, 2013

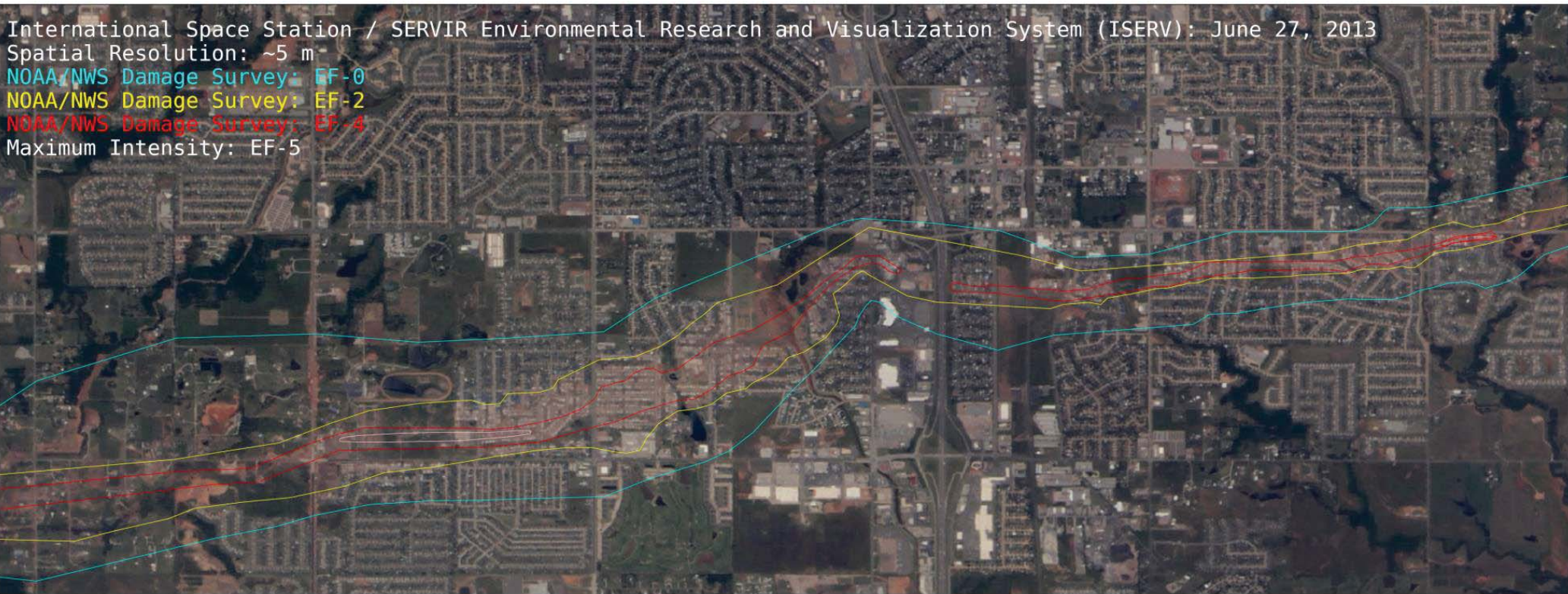
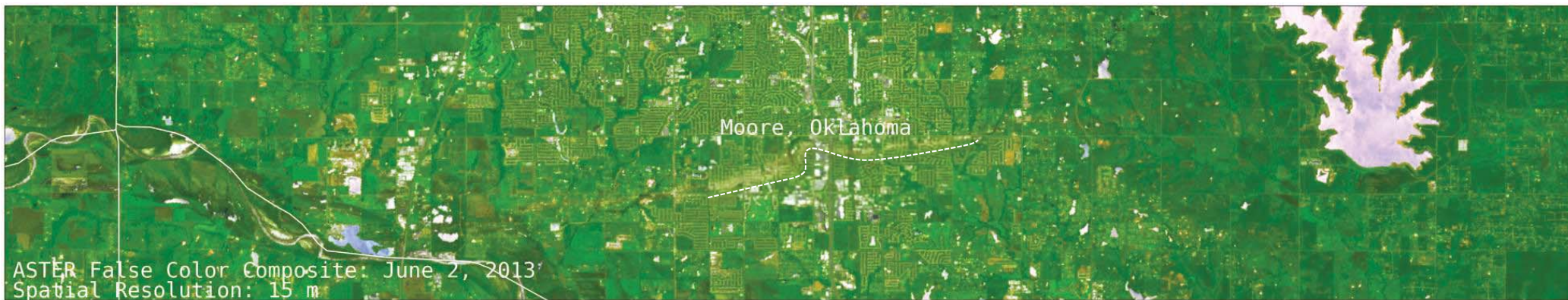
Worldview images
copyright DigitalGlobe,
Inc. and provided for
disaster support via
the USGS.

After Tornado:
May 22, 2013

Subjective Damage Analysis
NWS Official Survey

Visible Damage:
None Light Moderate Heavy

High resolution commercial satellite imagery can be acquired through partnerships with federal agencies like the USGS, and provided for help in damage assessments.



Imagery from NASA satellite missions and the International Space Station can also be used to aid in immediate damage assessments or for monitoring recovery.

Summary

- NASA's SPoRT Center in Huntsville supports the “research to operations” transition of unique NASA and NOAA observation and modeling capabilities.
- NASA's large fleet of Earth-observing satellites provides numerous applications for weather analysis and forecasting, modeling, and disaster response.
- <http://weather.msfc.nasa.gov/sport>

